

Reconocimiento de Patrones

Version 2022-2

Selección de Características: Branch & Bound

[Capítulo 3]

Dr. José Ramón Iglesias

DSP-ASIC BUILDER GROUP

Director Semillero TRIAC

Ingeniería Electronica

Universidad Popular del Cesar

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

(Take away 0)

Level 0

(Take away 1)

Level 1

(Take away 2)

Level 2

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

(Take away 0)

Level 0

12345

(Take away 1)

Level 1

(Take away 2)

Level 2

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

(Take away 0)

Level 0

12345

(Take away 1)

Level 1

2345

1345

1245

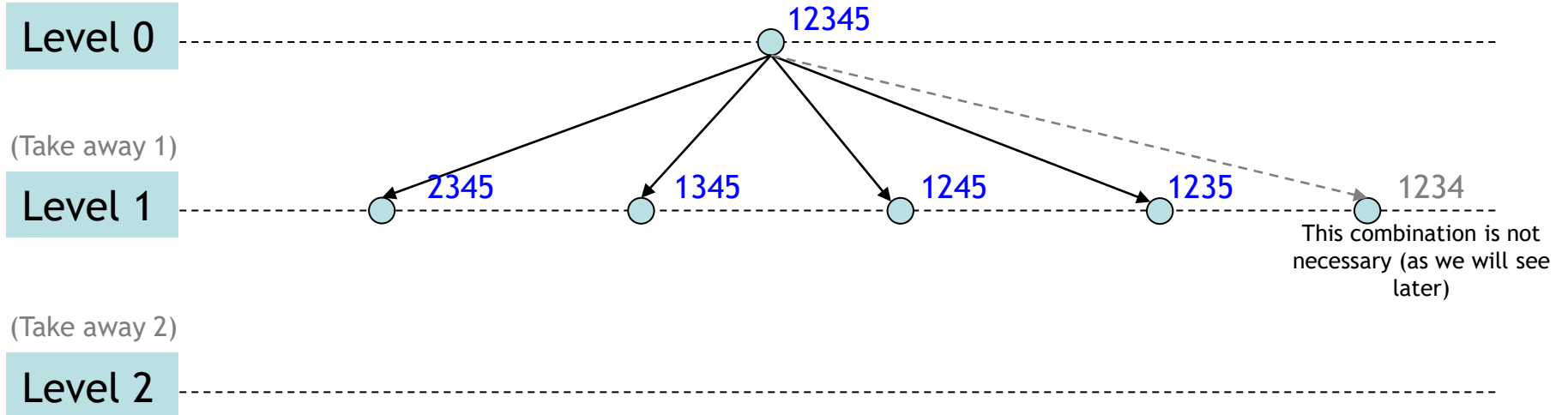
1235

1234

This combination is not
necessary (as we will see
later)

(Take away 2)

Level 2



Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

(Take away 0)

Level 0

12345

(Take away 1)

Level 1

2345

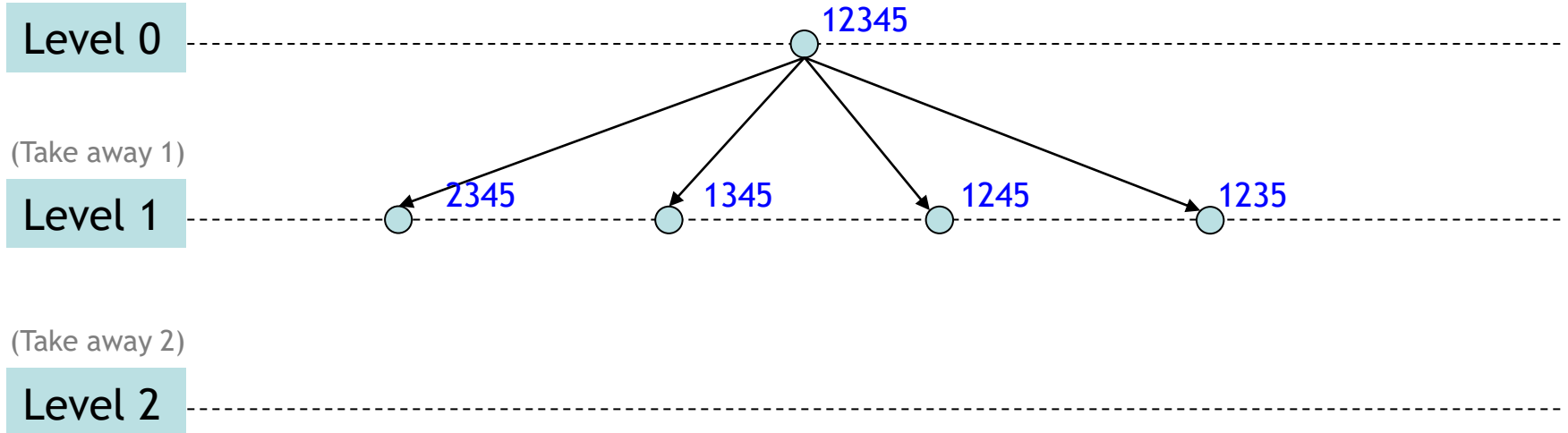
1345

1245

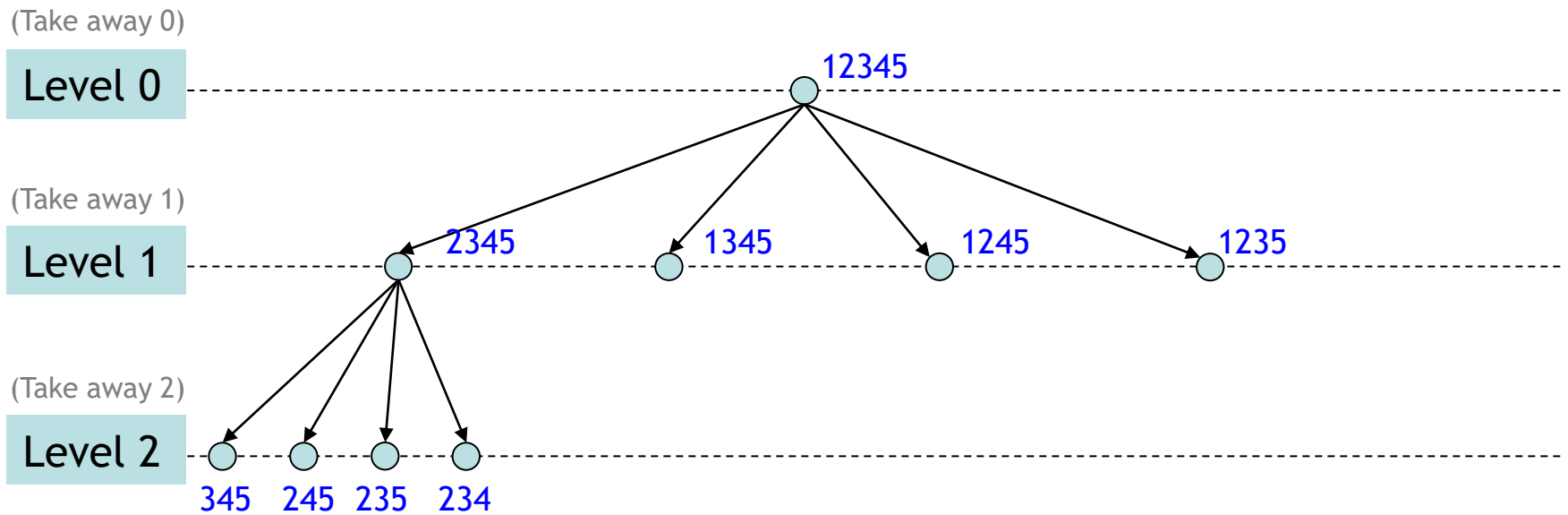
1235

(Take away 2)

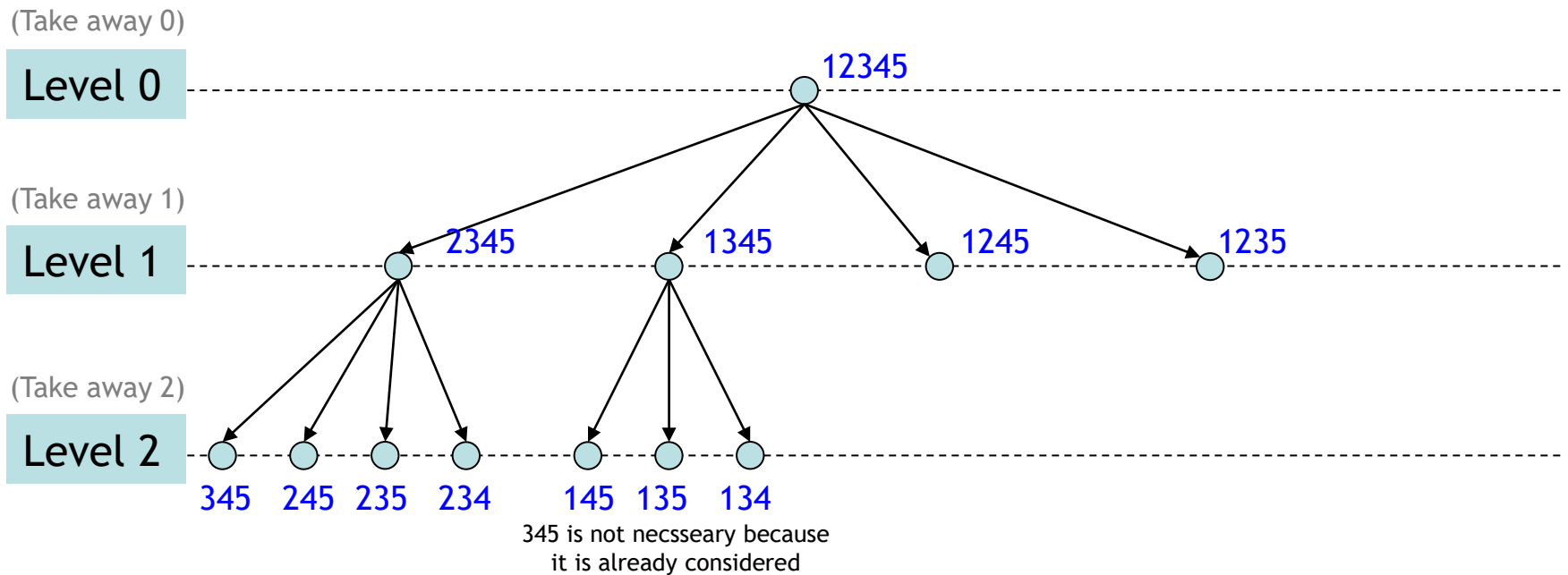
Level 2



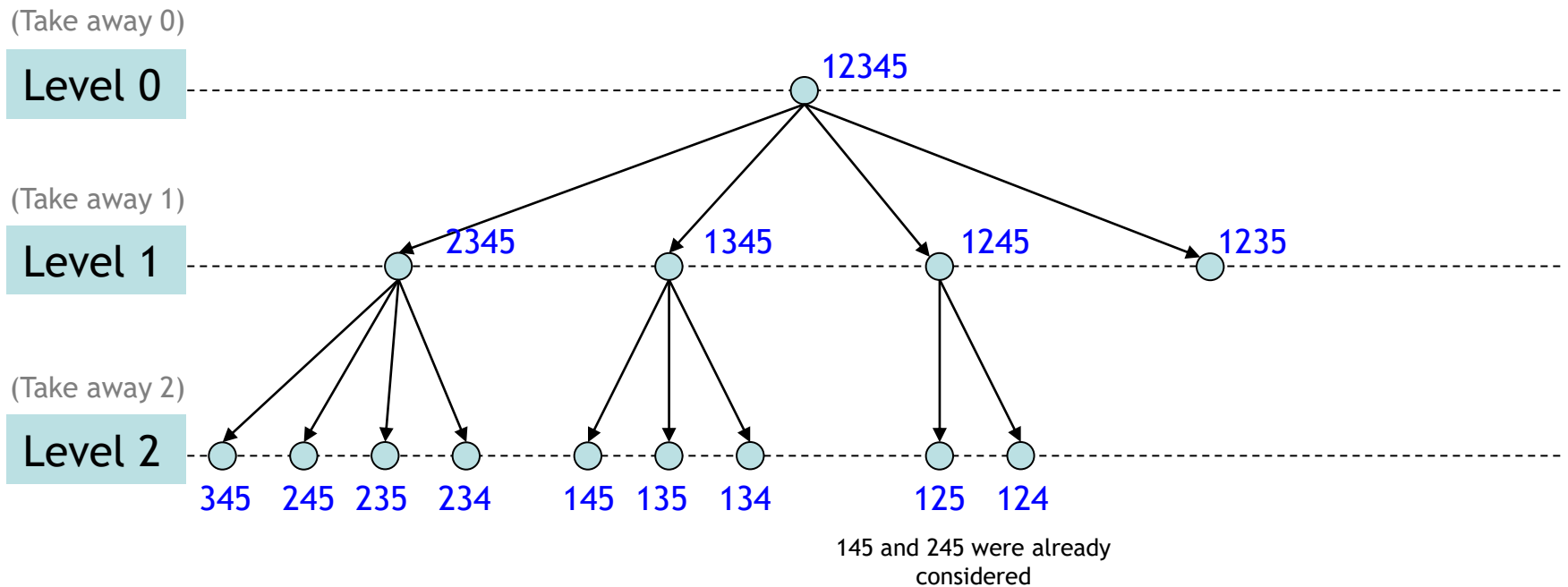
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



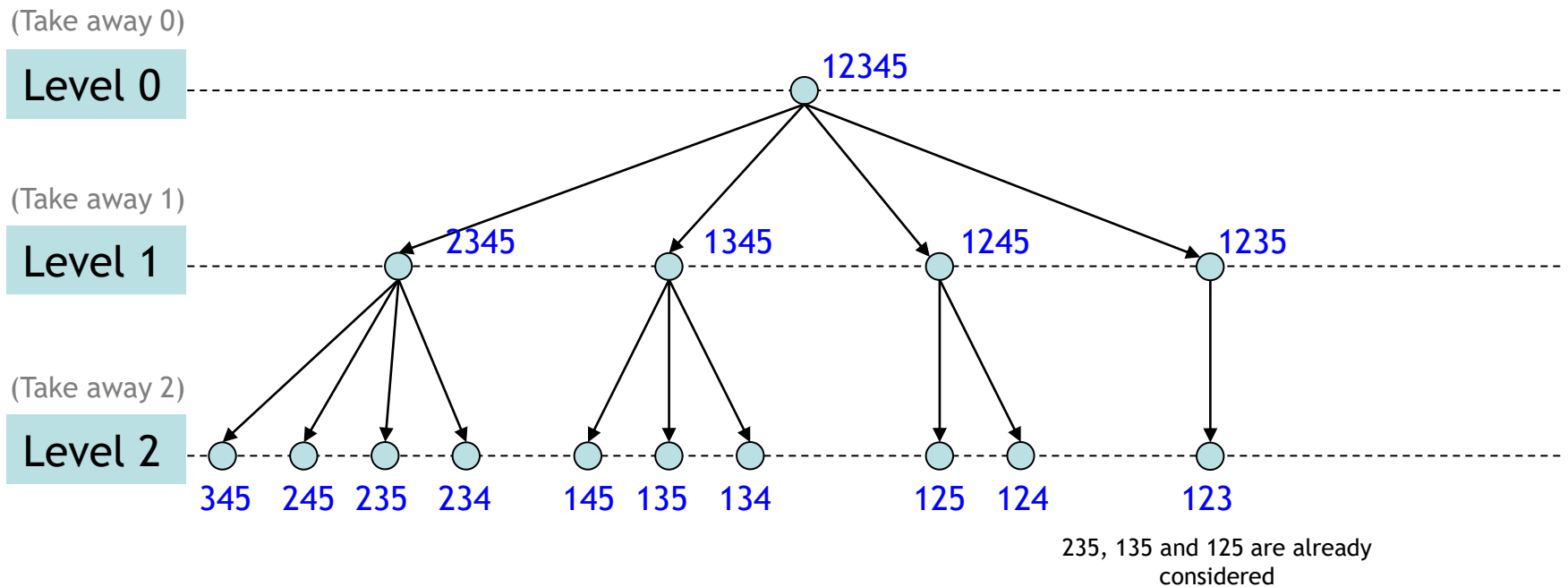
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



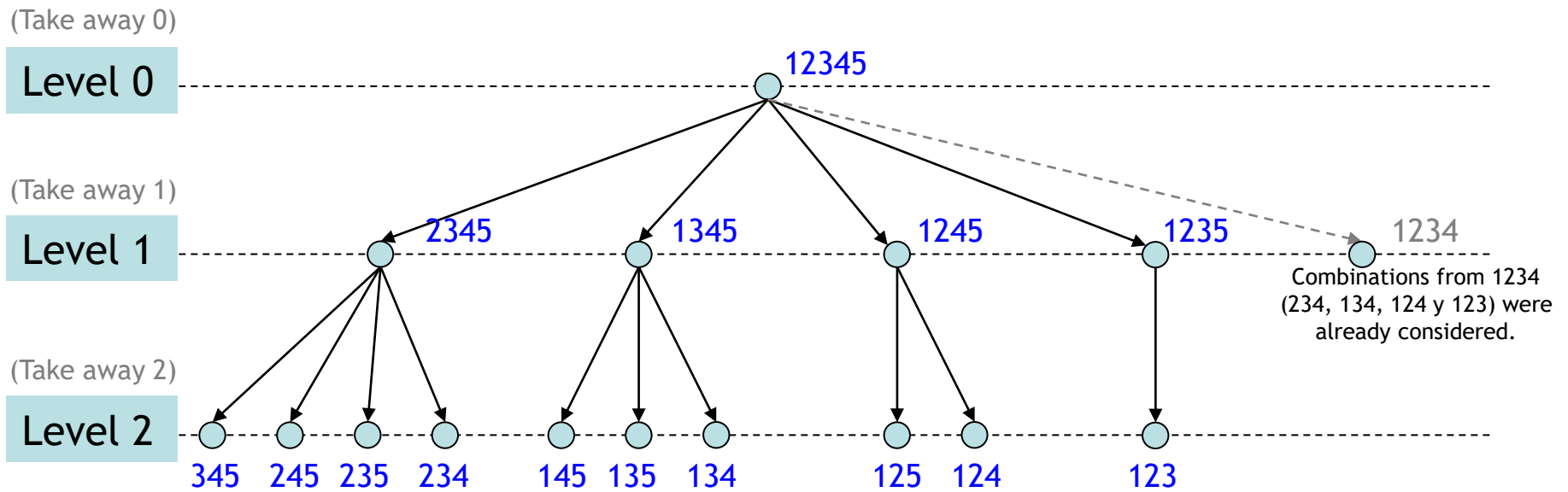
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



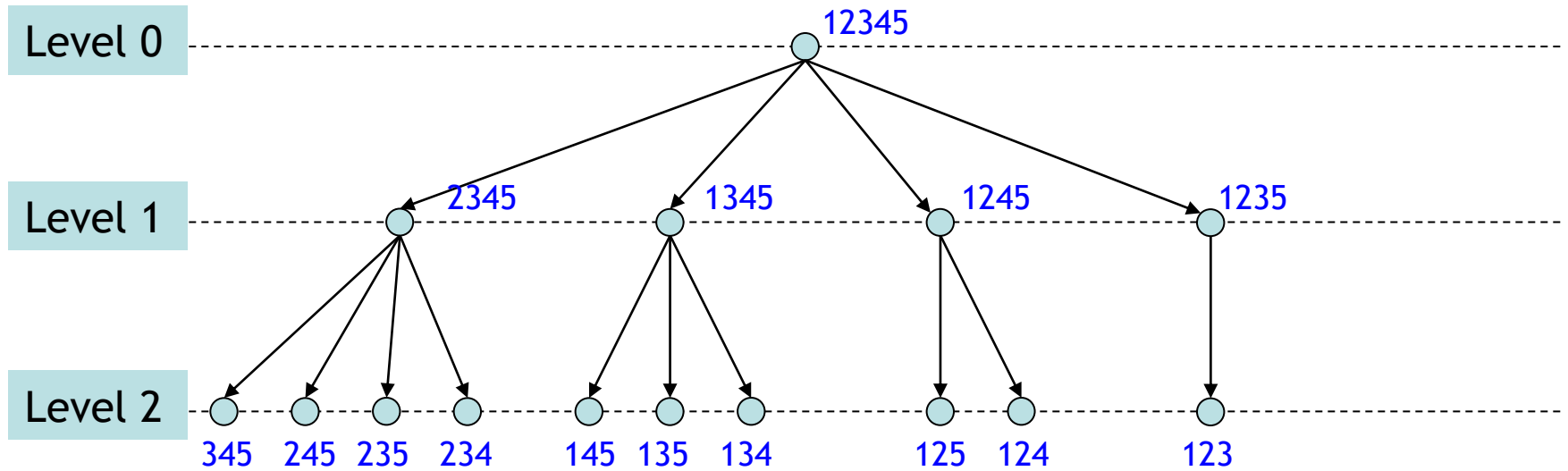
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

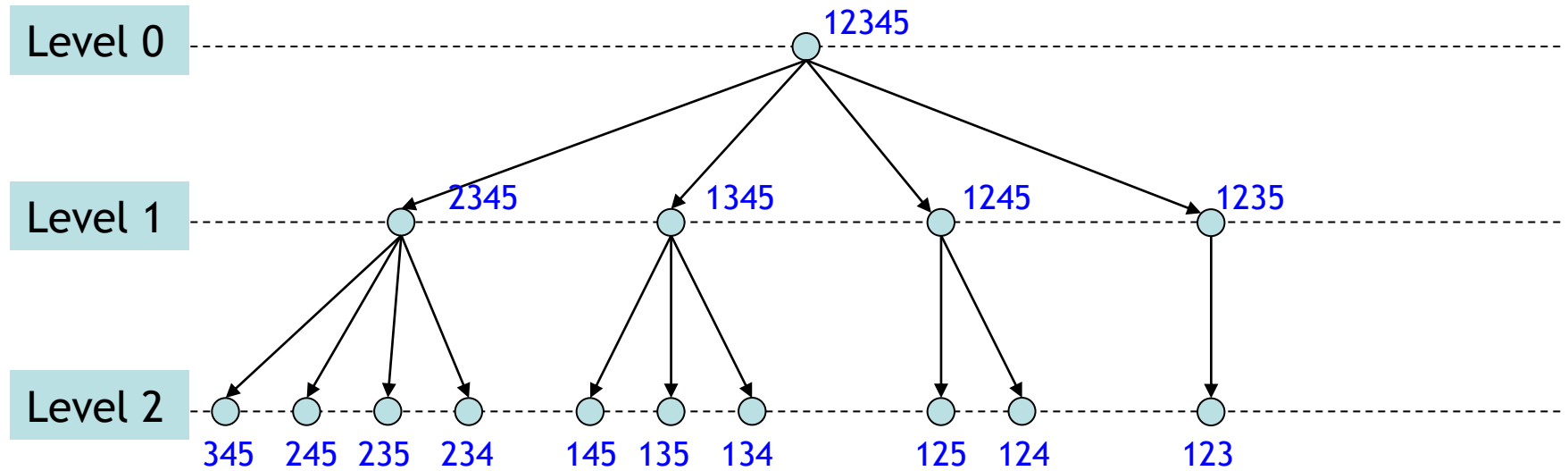


Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

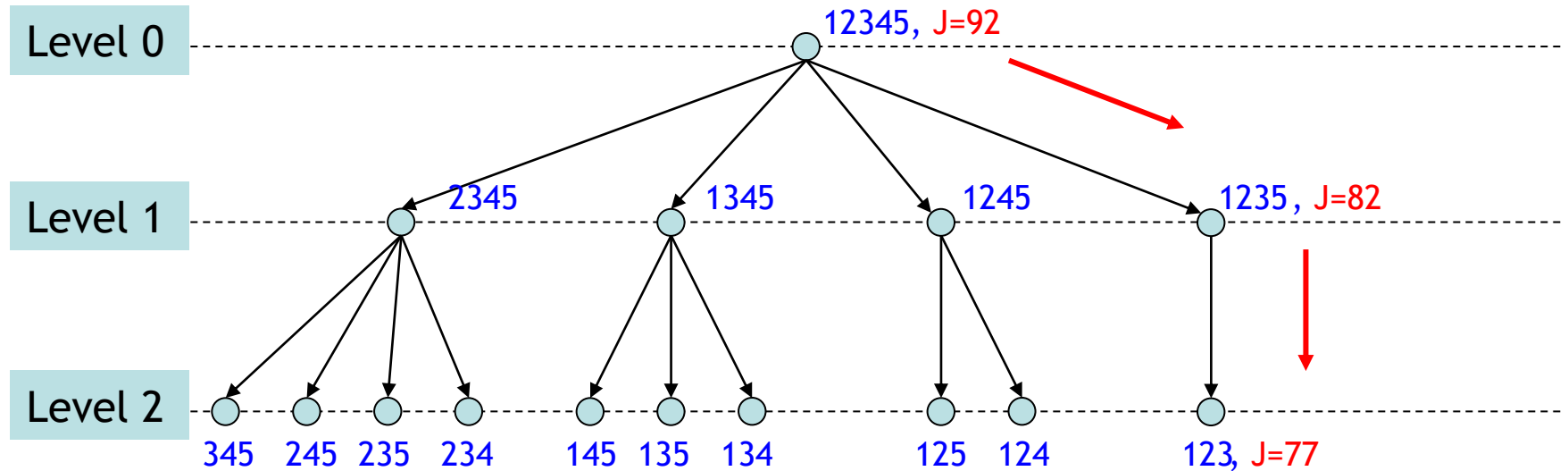


In Level 2 there are all possible combinations of 3 features.

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

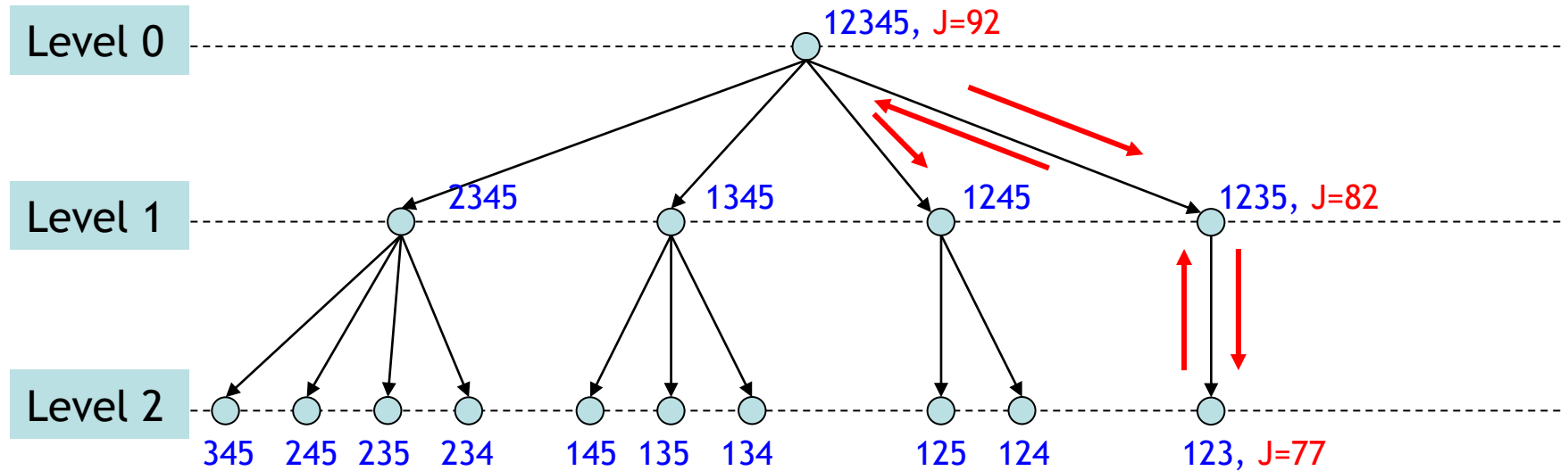


Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



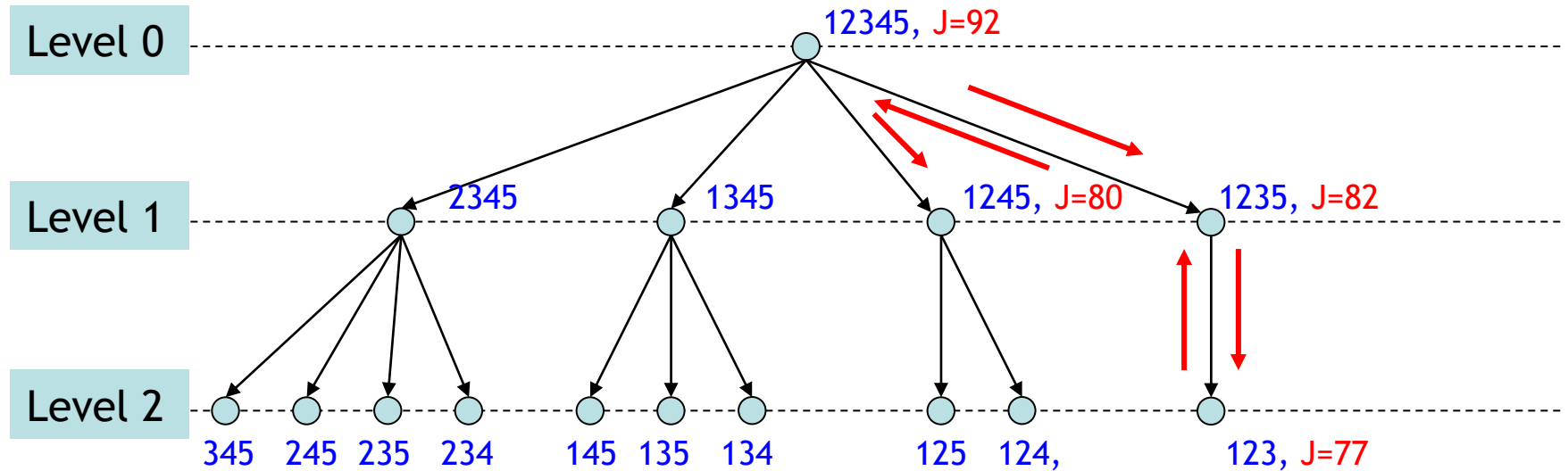
Best J = 77 using 123

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 77 using 123

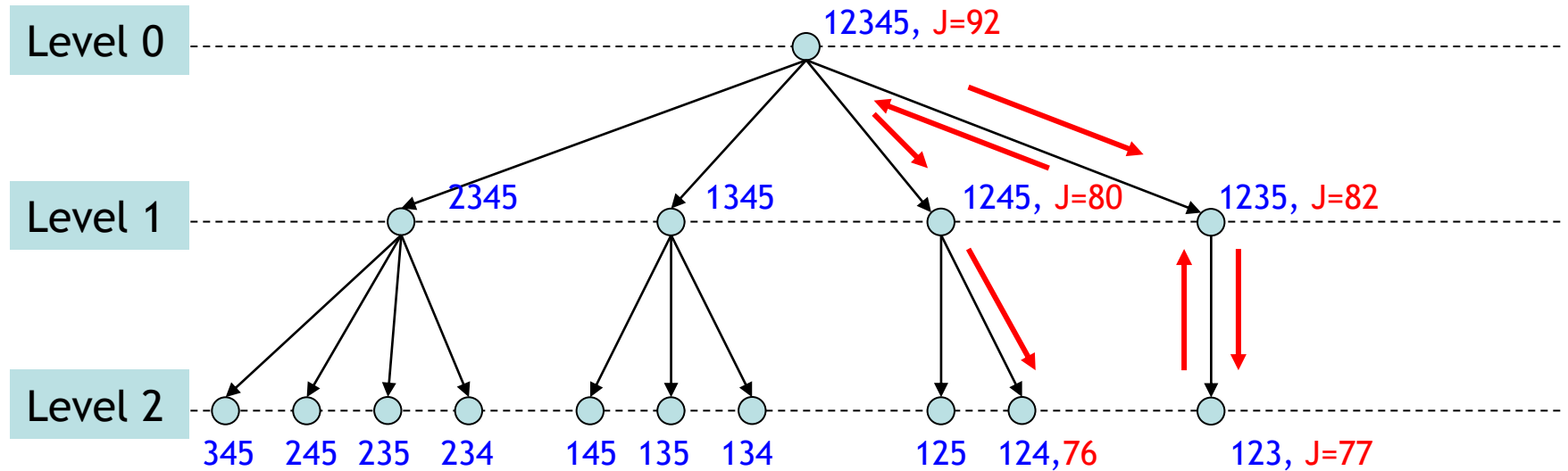
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 77 using 123

Since $77 > 76$ selection 123 is better than 124

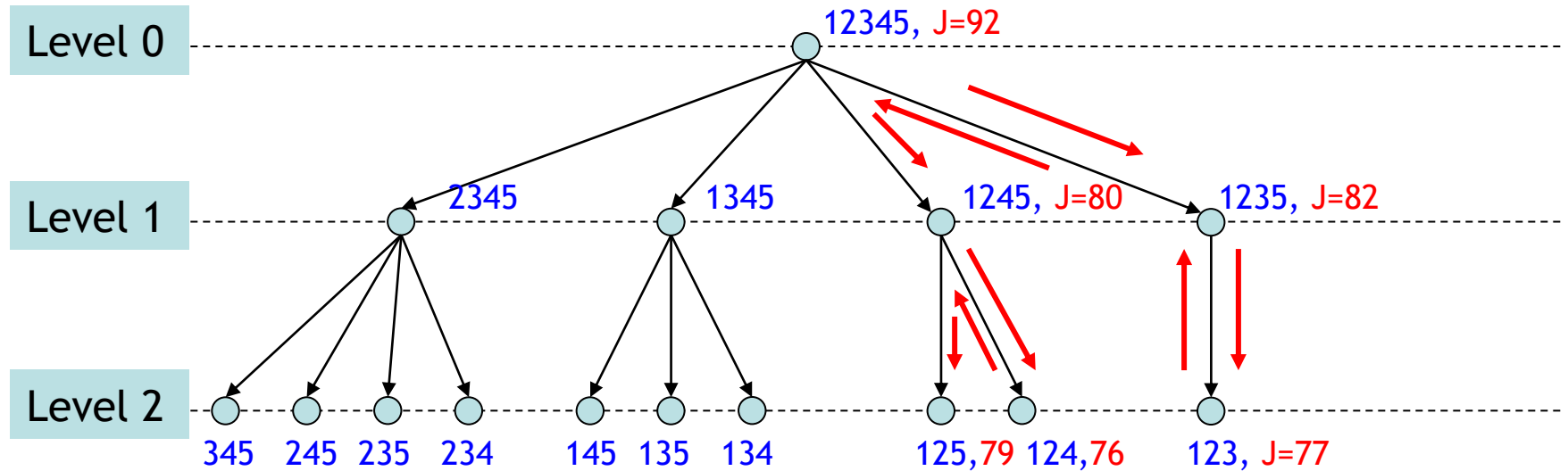
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 77 using 123

Since $77 > 76$ selection 123 is better than 124

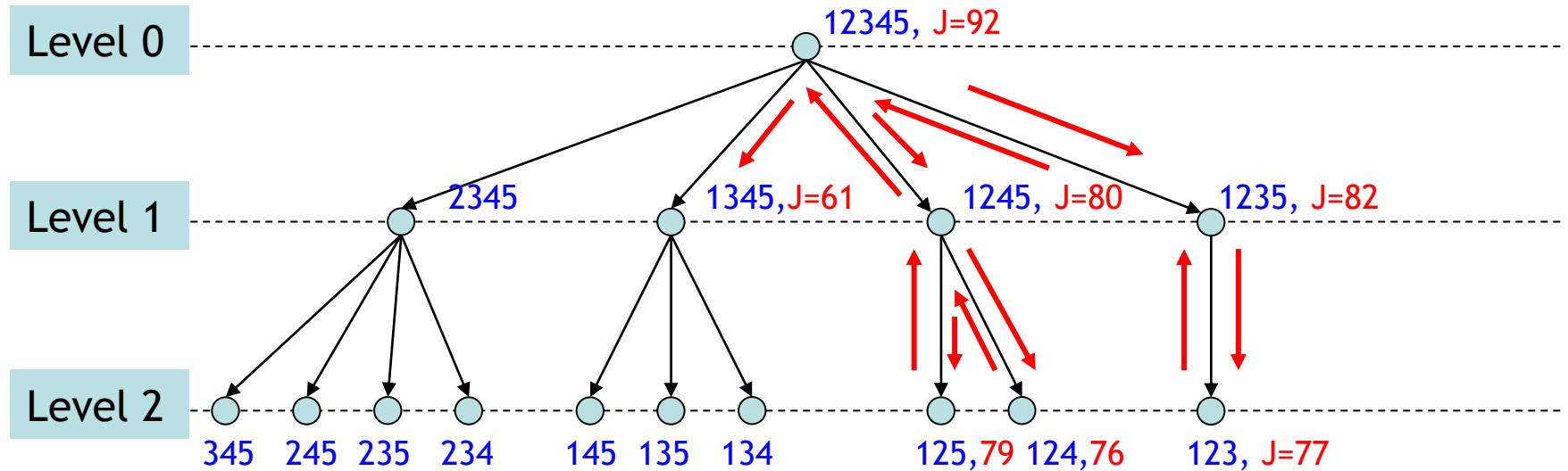
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 79 using 125

Since $79 > 77$ selection 125 is better than 123

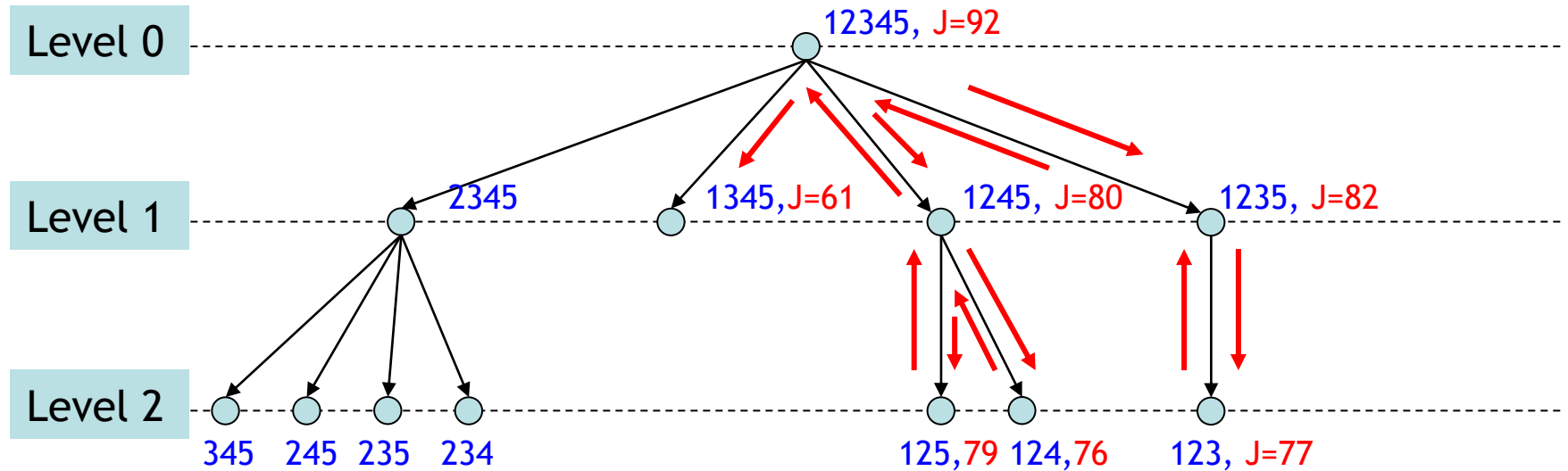
Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 79 using 125

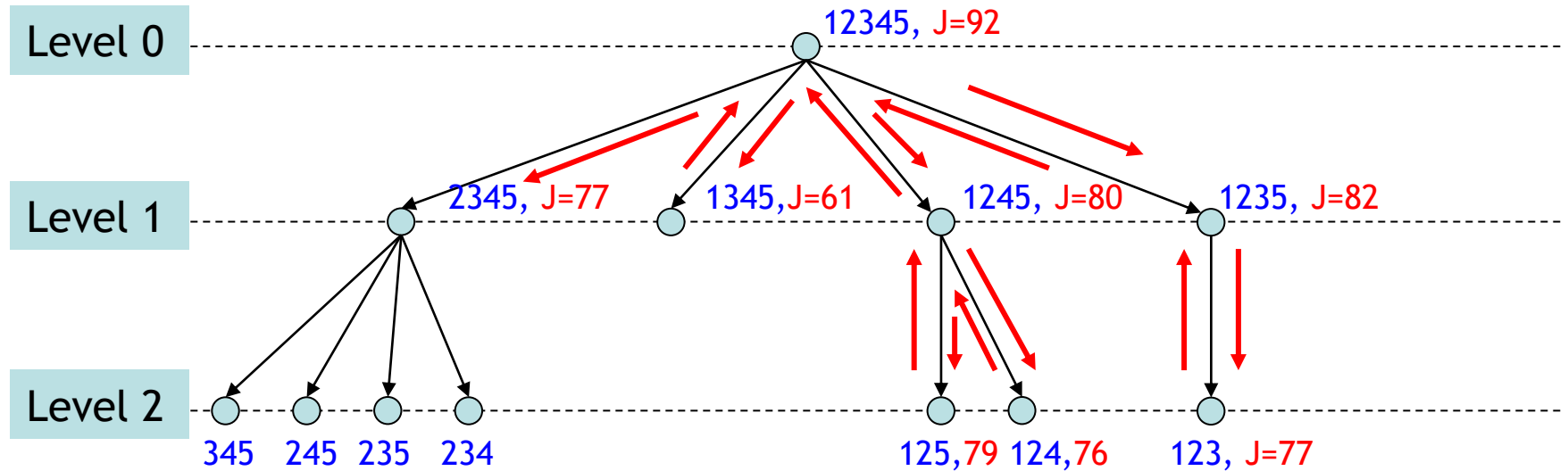
It is not necessary to evaluate 145, 135 and 134 because J will be $< 61 < 79$

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3



Best J = 79 using 125

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

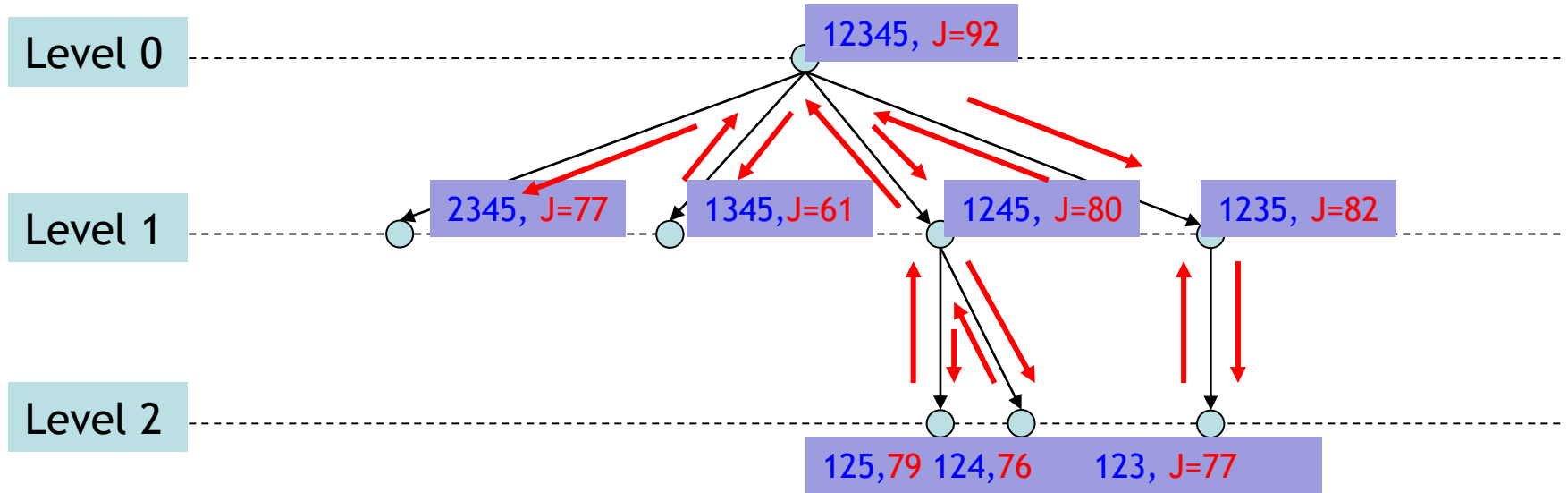


Best J = 79 using 125

It is not necessary to evaluate 345, 245, 235 and 234 because J will be $< 77 < 79$

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

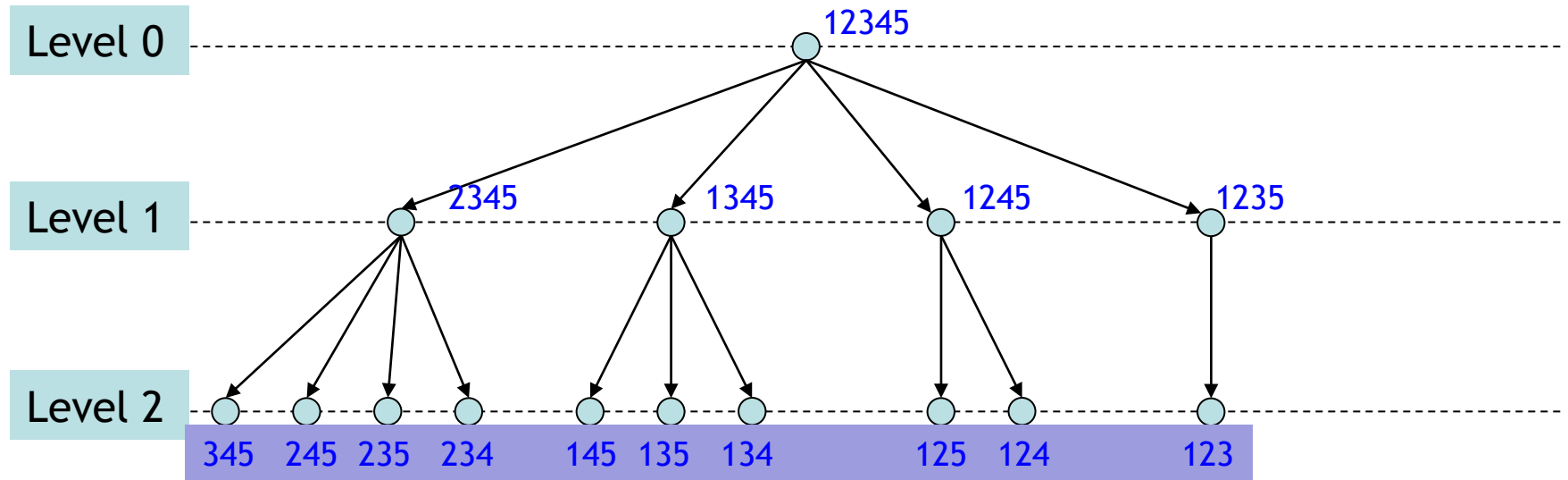
We found the global maximum after 8 evaluations (using B&B)



Best J = 79 using 125
global maximum

Problem Statement: Given 5 features (1,2,3,4,5), select the best 3

We found the global maximum after 10 evaluations (using Exhaustive Search)



Best J = 79 using 125
global maximum